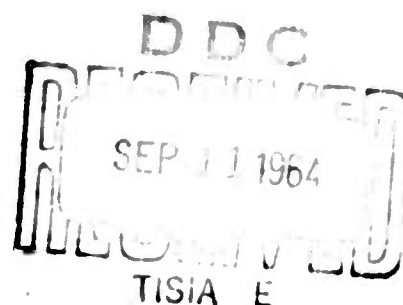


Technical Research Report 1137**RESEARCH TO IMPROVE
ENLISTED CLASSIFICATION TECHNIQUES**

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Technical Research Report 1137

**RESEARCH TO IMPROVE ENLISTED
CLASSIFICATION TECHNIQUES**

William H. Helme

**Submitted by Edmund F. Fuchs
Chief, Military Selection Research Laboratory**

Approved by


**J. E. Uhlaner
Director, Research Laboratories**


**Hubert E. Brogden
Chief Scientist**


**Charles S. Gersoni
Colonel, GS
Commanding**

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BRIEF

Requirement:

DCSPER has a continuing requirement for the development of tests and procedures that will increase the effectiveness of enlisted classification so that optimal use can be made of the potential and developed skills of the Army's manpower.

Procedure:

NEW CLASSIFICATION TECHNIQUES Task research and planning are currently being conducted on the following subtasks:

Improving differential classification through the Army Classification Battery (ACB).

Identifying and assigning potential career enlisted men.

Screening and assignment of enlisted men of relatively low ability.

Accomplishments FY 1963 and 1964:

New classification tests developed and ready for comprehensive evaluation as potential components of the ACB include:

1. Aptitude and ability tests for Electronics, General Maintenance, Motor Maintenance, and Clerical job areas.
2. Information tests. Tool Knowledge test and two Trade Knowledge tests for construction and mechanical-electrical jobs.
3. Personality-interest measures. Self-descriptive instruments for electronics, mechanical, and clerical MOS; Army Job Activity Questionnaires for Biochem, Mechanical, and Military Police jobs.

Army career and job motivation scales for use in assigning EM who are likely to remain in service beyond an initial period are undergoing field tryout.

The potential usefulness to the Army of men in AFQT Category IV has been evaluated.

An updated standard matrix of ACB test and aptitude area intercorrelations has been developed on recent large input samples for research and management operational reference.

Assistance was given the Korean Army in developing a classification system.

Utilization of findings:

Current and planned studies of experimental and operational tests across Army occupational areas will culminate in an updated aptitude area structure projected for operational implementation in 1966.

Reenlistment measures will enable the Army to assign career motivated individuals to hard-skill MOS requiring a lengthy training period, thus reducing turnover in jobs for which continuity of service is important.

The AFQT Category IV study provides a basis for management decision with regard to induction and training assignment of men of lower than average trainability.

RESEARCH TO IMPROVE ENLISTED CLASSIFICATION TECHNIQUES

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RESEARCH TO IMPROVE ENLISTED CLASSIFICATION TECHNIQUES

TASK OBJECTIVES

Under the NEW CLASSIFICATION TECHNIQUES Task, research is conducted to increase the effectiveness of enlisted classification and assignment across all Military Occupational Specialties (MOS), keeping pace with the changing requirements of Army training and jobs. Initial classification to MOS training is based largely on Army Classification Battery (ACB) scores. Currently, these test scores are combined in pairs to yield aptitude area scores differentially predictive of success in occupational areas and subareas. A substantial research effort is devoted to improving ACB measures, maintaining their timeliness, and identifying the combinations of tests which best select men for certain groups of jobs. The goal is to determine those combinations of tests and of jobs which result in optimum assignment of men to MOS training through differential classification. Additional objectives of the Task are to develop techniques for special classification purposes such as identifying potential career men for training in critical and long-term training jobs.

The present report deals with four research programs:

1. Improving differential classification through the Army Classification Battery.
2. Identifying and utilizing potential career enlisted men.
3. Screening and assignment of lower mental category enlisted men.
4. Physical proficiency measures to classify EM for combat and combat-support MOS with unusual physical demands.

IMPROVING DIFFERENTIAL CLASSIFICATION THROUGH THE ACB

The objective of initial classification is to allocate EM to MOS training so that the pool of talent will be matched to Army job requirements in such a way as to yield the highest total aggregate of effective performance in Army jobs. The ACB provides objective standardized measures by which to classify the available men differentially for the training spaces to be filled. Research on the ACB is designed to provide measures highly valid for one set of jobs and relatively less valid for all others. This effort includes not only revising old tests and constructing new ones, but also comprehensive analysis of the relationships among MOS training courses and jobs in terms of the particular abilities and other personal characteristics needed for success in each job. The current phase of ACB research is directed toward a new integration of results,

to be implemented in a reorganized ACB and reconstituted system of aptitude areas and MOS. This research activity tentatively programmed for completion in the latter part of 1965 and implementation during 1966, includes identifying and introducing new replacement or added measures of three principal types: (1) ability tests--spatial, perceptual, clerical; (2) information measures--electrical, mechanical, biochemical; and (3) personality-interest questionnaires--clerical, mechanical, combat-oriented.

Permeating the various projects under this subtask is a studied effort to enhance the efficiency of psychological measurement by reducing the factorial overlap of measures as much as possible, shortening individual tests to the minimum consistent with adequate reliability and validity, and making maximum use of data from screening and induction testing with the Armed Forces Qualification Test (AFQT) and the Army Qualification Battery (AQB).

Current Status of the ACB and Aptitude Area System

The ACB consists at present of eleven tests, combined in pairs to provide eight aptitude area scores. Seven of these measures have been introduced since 1957: two new measures for classification of combat MOS--the Classification Inventory (CI) and the General Information Test (GIT)--and five improved and updated replacement tests--Verbal (VE), Arithmetic Reasoning (AR), Army Clerical Speed (ACS), Automotive Information (AI), and Electronics Information (EI). Of the other four tests in the ACB, the Army Radio Code Aptitude Test (ARC) retains its content, but new tape recordings have replaced the earlier records with some improvement in quality. In addition, new standard score norms were introduced yielding a full 50 to 150 range in place of the former norms which grouped all scores below 101 as "Unsatisfactory."

Minor changes in the composition of two aptitude areas have been instituted. In response to findings that the Clerical and Radio Code aptitude area composites, in which the ACS and ARC scores have been double-weighted in combination with VE, would be more effective if men relatively weak in the verbal ability component were excluded, the composites were changed to give VE equal weight. This change is estimated to have yielded a slight increase in predictive validity for courses in the areas concerned.

Improvement and replacement of the remaining three tests--Pattern Analysis (PA), Mechanical Aptitude (MA), and Shop Mechanics (SM)--have been undertaken. Basis for new measures are (1) experimental ability tests included in the Army Differential Aptitude Series (ADAS) which has been the subject of extensive validity research, and (2) information tests now being tried out for construction and other mechanical jobs. The ADAS includes a replacement of the ACB Pattern Analysis Test, as well as two other tests of spatial ability. It also includes a new form of the Mechanical Aptitude Test. The information tests include a Tool Knowledge Test and two Trade Knowledge Tests designed to replace the Shop Mechanics Test and possibly the Mechanical Aptitude Test for certain job areas. Initial findings from studies of these measures are discussed below. One result of these research efforts will be a fully updated ACB covering at least the same valid psychological content as the present but with enhanced differential predictive value.

A recent product of research on the current ACB is the new standard matrix of intercorrelations among the ACB tests. This matrix, representing the parameters of the full mobilization input as in World War II, is based on large input samples, stratified on AFQT, obtained since 1958. Using the matrix, the effects on the initial classification of enlisted men of any prospective or operational change in the ACB can be determined. Adjustment from a full mobilization to any more restrictive screening and classification standards can be made to fit any current situation. The matrix of ACB test intercorrelations is shown in Appendix Table A-1; of aptitude area intercorrelations in Appendix Table A-2.

Analysis of Ability Measures in Army Differential Aptitude Series

Analysis of the set of 14 cognitive ability measures in the ADAS--not yet completed--will yield information comparing the effectiveness of these experimental measures with that of operational ACB tests for MOS in the Electronics, General Maintenance, Motor Maintenance, and Clerical job areas. Interim findings suggest that the extension of the ACB into additional cognitive domains may yield moderately improved differential validity. It is likely also that certain of the experimental replacements for older ACB tests, such as the Mechanical Principles Test designed to replace Mechanical Aptitude, will improve prediction for the Electronics and Motor Maintenance areas. After completion of the analysis, the most promising instruments will be validated in conjunction with the new information measures before deciding upon introduction of any of the experimental measures into the ACB.

Analysis of New Information Tests in the Mechanical Domain

Initial study of the experimental construction-mechanical information tests involved the validation of 340 items, assembled in a Tool Knowledge Test and two Trade Knowledge Tests, to identify content predictive of success in training in five MOS or MOS groups: Pioneer (MOS 120), Field Communications (MOS 310), Lineman (MOS 321), Carpenter and related Engineer Construction (MOS 511, 512, 521, 522), and Construction Machine Operation (MOS 626, 627). The experimental tests were also administered to a large enlisted input sample during reception processing to ascertain the difficulty levels of the items. Using valid items of appropriate difficulty level, 12 scales of 25 items each were established. Two Tool Knowledge and two Trade Knowledge scales were assembled for each of three job categories: Construction (120, 511), Electrical (312, 321), and General (all MOS groups) (Appendix Table A-3). These scales will be tried out in appropriate MOS samples, independent of the samples in which a given scale was derived. Those which prove effective are to be standardized and validated across a wide range of MOS representative of all occupational areas. This last step is planned in conjunction with validation and standardization of the most promising cognitive and noncognitive measures developed in the ADAS and other current research.

Analysis of Personality-Interest Measures

Two kinds of information about the individual play an appreciable part in the classification process. One kind, civilian education and experience, is reflected in ACB test scores: Academic knowledge the individual has gained is reflected to a great extent in such broad cognitive tests as Verbal, Arithmetic Reasoning, and Mechanical Aptitude. The special job knowledge he has acquired tends to be reflected in information tests such as Shop Mechanics, Automotive Information, and Electronics Information. Data of a second kind--interest and job-oriented motivation--are expressed in the assignment preferences stated in the classification interview, and quite decisively in the enlistment commitment. This kind of information is reflected only partially in the Classification Inventory and indirectly in the avocational knowledge measured in the General Information Test--instruments used only in classification to combat arms.

Experimental personality and interest measures under development represent two approaches to broadening the measurement of noncognitive factors to include all the occupational areas. One approach employs a wide variety of questions on background, attitudes, and feelings which are tried out to find whether they are usefully predictive of success in training and job performance. This broad empirical approach has been followed in Army research over a number of years. Out of it have come, in addition to the operational Classification Inventory used in classification to Infantry MOS, scales with substantial validity for mechanical, clerical, and electronics training and job success. Three scales of the experimental Army Differential Aptitude Series--Electronics, Mechanical, and Clerical--have shown clear differential validity for MOS in the areas for which they were constructed. These scales were among those derived empirically from earlier item analyses. Two a priori scales--Mechanical and Clerical--showed appreciable validity for their respective areas, but were differentiated less clearly from measures in other areas. Somewhat better differential prediction was achieved with a priori measures of clerical, mechanical, and electronics orientation constructed to test hypotheses based on findings from earlier studies. Interim findings on the validity of these scales and correlation of the scales with aptitude and information tests of the ACB are appended in Tables A-4 and A-5.

A second approach to the development of personality measures investigates more directly the specific activities and interests which are believed to contribute to job preference. This approach is an attempt to develop objective measures of preferences that are obtained in a variable and less objective fashion during the classification interview or reenlistment process. The specific activity-interest method is the basis for the Army Job Activity Questionnaires now under development. Three questionnaires--Biochem (medical and chemical), Mechanical (for construction and related MOS), and Military Police--have been constructed and administered to appropriate input and follow-up training and job samples for validity analysis.

Each questionnaire contains four sets of questions. One set of questions which is common to all forms deals with preferences as to general working conditions. A second set deals with preferences for specific activities. In another set, Army jobs are described briefly and examinee expresses the extent of his interest in each one. In a fourth section, information is obtained on the individual's pre-Army training and experience in activities related to the area concerned. Thus, preferences for activities, jobs, and working conditions, together with background experience, can be studied in relation to performance in MOS training and jobs for the purpose of measuring intrinsic interest in the MOS.

Results of analysis of the job activity questionnaires, together with findings on the effectiveness of the ADAS scales, will be applied in determining content for a personality-interest inventory to be used as an aid in classifying men to areas other than the combat arms.

IDENTIFYING POTENTIAL CAREER ENLISTED MEN

The force structure of the Army requires that a substantial proportion of total enlisted strength--estimated by various plans to be in the range of 30 to 60%--be career soldiers, the key men who advance to positions of high technical skill and leadership. Experience has demonstrated that a low percentage of first-term men--approximately 20% of enlistees and less than 5% of draftees--reenlist at the end of their initial term of service. In contrast, more than 90% of second or later-term men reenlist. To build up the career portion of the force, it is necessary to achieve an appreciable first-term reenlistment rate. The need is felt more sharply in the case of MOS in which the length and expense of training is unusually great--the "hard skills." One approach which the New Classification Techniques Task has taken to this problem is to develop means of identifying, on entry into service, those men whose attitudes, interests, and aspirations are compatible with the opportunities and exigencies of service life. A second approach is to determine the effect of Army experiences on career intention and orientation.

To develop means of identifying the career soldier early in his term of service, the attitudes, background, and interests of approximately 5000 enlistees were measured at entry into service. A subsample of close to 1000 was followed up after one year of service, and then career intentions and job performance evaluations were obtained. Finally, data on action taken with respect to reenlistment--and eligibility to reenlist--were obtained for over 80% of the original sample.

A number of scales were assembled out of the original pool of questionnaire items. Items were selected to maximize the prediction of reenlistment action at the end of three years' service. One scale of 25 items was predictive of reenlistment generally--across all MOS in which the men were employed. Eleven additional scales were obtained, each found to be promising predictors of reenlistment among men assigned to particular MOS groups. Four supplementary scales were designed to provide greater discrimination in measurement. Three of these scales were composed of items which identified men who responded on entry into service the same way as reenlistees

on the general reenlistment scale, but who changed their intentions at various points later on--1 year, 2 1/2 years, or at point of final decision. A fourth scale was based on items on which the sample as a whole showed marked negative change of attitude toward Army conditions and prospects. One more scale was constructed which reflected changeability of attitudes toward both self and Army life. Such a scale may be an immaturity measure useful in identifying those men whose attitudes and expectations on entry into service are unrealistic and thus liable to change.

The scales (listed in Table 1) are currently being analyzed in a large sample withheld from the analysis on which the items were selected, so that independent estimates of their validity can be obtained. The most predictive sets of items will be included in a Career Inventory to be administered on entry into service for the purpose of identifying men for training for hard-skill or leadership MOS. Specific MOS scales which prove valid in the independent sample will be used to classify men in MOS in which they are likely to reenlist--provided they meet other prerequisites and MOS requirements permit.

Research on the effect of Army experiences on career motivation was initiated in the past year, with a study of the effect of basic training and knowledge of initial assignment on attitudes toward Army life and careers. Samples of enlisted input at two reception stations were administered a large pool of items, some derived from the three-year study above and some designed to test factors hypothesized to affect reenlistment intention. The group was retested after six weeks. Half the group had learned their MOS AIT assignments and half had not yet been notified of their assignment. In addition to information on career motivation under varying conditions of knowledge of assignment, analysis will yield data on attitude change during basic combat training. The initial testing included data on assignment preference so that congruence of assignment with preference could be determined. Later experiments will be designed to evaluate effects of AIT experience, initial job experience, and other significant personnel assignment events on attitude toward a service career.

SCREENING AND ASSIGNMENT OF LOWER MENTAL CATEGORY ENLISTED MEN

Initiated in 1960 in response to a DCSPER requirement, research on the screening and assignment of enlisted men scoring in AFQT Mental Category IV has now been completed. The findings are relevant not only to the Army's optimum use of resources in the manpower pool, but also to plans for possible future mobilization to meet requirements of varying degrees of emergency.

Since 1958, the Army has conducted supplementary screening of men called up for induction who score in AFQT Category IV. The current standard for these men calls for a General Technical (GT) aptitude area score of at least 80, and scores of 90 or higher on two or more other areas. The current enlistment standard accepts upper Category IV men

Table 1

EXPERIMENTAL SCALES DERIVED FROM ANALYSIS TO PREDICT REENLISTMENT

| Scale | Number of Items | Derivation |
|--------------------------------------|--------------------|--|
| <u>A. General Reenlistment</u> | 23 | Correlation between response on entry and final reenlistment action at end of 3 years |
| <u>B. Empirical MOS Reenlistment</u> | | <u>Same as A but confined to single MOS group</u> |
| 1. Combat (High) | 22 | MOS with initial digit 1; skill level .1 or higher |
| 2. Combat (Low) | 22 | MOS with initial digit 1; skill level .0 |
| 3. Electronics Repair | 22 | MOS with initial digit 2 or 3 |
| 4. Mechanical Maint (High) | 22 | MOS with initial digit 4, 5, 6; skill level .1 |
| 5. Mechanical Maint (Low) | 22 | MOS with initial digit 4,5,6; skill or higher level .0 |
| 5. Operator | 22 | MOS in operator MOS, with little or no maintenance duties, e.g., 293, 310, 723-5, 050-9 |
| 6. Drivers | 22 | MOS 625-7, 640-2 |
| 7. Clerks | 22 | MOS with initial digit 7 n.e.c. |
| 8. Service | 22 | MOS 910, 911.0, 94 group |
| 9. Military Police | 22 | MOS in group 95 |
| 10. General Technical | 22 | MOS with initial digit 8, 9 n.e.c. |
| <u>C. Suppressors and Moderators</u> | | |
| 1. Initial Intention | 39 | Correlation with entry intention, not later |
| 2. One-Year Intention | 23 | Correlation with entry and 1-year, not final action |
| 3. Concurrent Intention | 16 | Correlation with intention at same time (entry, 2 1/2 years) but not predictive of later intention or action |
| 4. Attitude Change | 27 | Items on which percent of favorable responses declines markedly with Army experience |
| 5. Lability | 40 | Items of low retest correlation from entry to 2 1/2 years |

(21-30 percentile) who are high school graduates and have three or more area scores of 90 or above. These standards were established on a rational basis rather than on a particular research investigation directed to the problem.

The present research has been conducted in two phases:

1. Follow-up of a sample of 804 Category IV enlistees, accepted in the period August-December 1958 on the standard of AFQT 21-30 plus two aptitude area scores of 90 or higher. Job performance evaluations were obtained on these men after 12 to 18 months' service, except for 137 discharged earlier. For comparison, performance ratings were also obtained for all their coworkers in the same MOS and squads. A second criterion of military adjustment was also obtained, based on the incidence of disciplinary action. Analysis was based mainly on the enlistee (RA) Category IV cases, in comparison with the RA 31-50 percentile (N = 353) and inductee (US) 10-50 percentile coworkers (N = 312).

2. Reanalysis of data on training performance in Army schools from the period prior to 1958 when standards for induction and enlistment were generally at the 10th percentile on AFQT. These data had been obtained in an extensive series of studies of ACB tests and aptitude areas as predictors of final course grades. Samples were large, ranging from 200 to over 1000 in each course. Percent of lower category men (AFQT 10-50) varied from virtually 0 to over 80, depending on course prerequisites.

As an aid in estimating the usefulness to the Army of Category IV and lower Category III men, the percentages that would be expected to perform acceptably in entry MOS with low or moderate skill level requirements was ascertained. With respect to job performance, a rating predicted by an AFQT percentile score of 31 was defined as "acceptable." A rating level predicted by the AFQT 50th percentile was defined as the "career" level, the higher standard being required for the skills and leadership responsibilities to which the career soldier should advance. In the training course samples, the passing grade of 70 was defined as "acceptable"; no "career" level was appropriate since the courses studied were all initial advanced individual training. Nearly half the RA Category IV men attained the "acceptable" level of performance and about 40 percent attained the "career" level (Table 2). Analysis of the particular job areas reveals, however, that in combat and close combat-support MOS (Field Communications Crewmen¹/ assigned to combat units), there was virtually no difference in performance of specially selected RA Category IV men and otherwise unselected RA lower Category III men. In other non-combat MOS, on the other hand, the RA men in lower Category III performed significantly better than the RA Category IV men. On all MOS, the inductee 10-50 percentile group performed far better than either RA group.

¹/On the small samples of MOS Group 31, the RA IV men were not significantly higher than the RA low III group.

Table 2

PERCENT OF LOWER MENTAL CATEGORY EM ATTAINING ACCEPTABLE AND CAREER STANDARDS IN ARMY JOBS

| Job Area | Number of Cases | | | Percent Acceptable | | | Percent Career | | |
|--------------------------------------|-----------------|-------|-------|--------------------|-------|-------|----------------|-------|-------|
| | RA | RA | US | RA | RA | US | RA | RA | US |
| | 21-30 | 31-50 | 10-50 | 21-30 | 31-50 | 10-50 | 21-30 | 31-50 | 10-50 |
| Infantry, Airborne | 218 | 127 | 66 | 50 | 52 | 60 | 43 | 43 | 55 |
| Armor, Artillery, Engineers | 178 | 85 | 92 | 49 | 49 | 65 | 42 | 43 | 57 |
| Field Communications | 43 | 14 | 27 | 44 | 37 | 54 | 39 | 31 | 49 |
| Military Crafts | 63 | 30 | 39 | 43 | 64 | 78 | 39 | 55 | 75 |
| Automotive Maintenance and Transport | 83 | 53 | -- | 44 | 51 | -- | 39 | 46 | -- |
| Clerical Administration and Supply | 29 | 15 | -- | 48 | 68 | -- | 43 | 63 | -- |
| Medical Care, Military Police | 50 | 25 | 80 | 49 | 62 | 78 | 44 | 55 | 74 |

According to estimates arrived at by analysis of Army School training samples (Table 3), only in such MOS as Wire Maintenance (321, 327), Teletype Maintenance (341), Powerman (351), Auxiliary Services (546), Supply Handling (550), Medical Specialist (910) and Cook (941) would a substantial proportion of Category IV men be expected to pass. When the percent expected to pass ranges from 50 to 65, it indicates that there is adequate probability^{2/} of passing the course only when the individual attains a standard score of 100 or better on the aptitude area of selection. Such special ability appears to be required to compensate for the relatively low level of general mental ability. For men in lower Category III, scores in the 90 to 100 range on the aptitude area are needed for adequate probability of passing courses of average level of difficulty; scores of 110 or better are needed for courses of high difficulty. Thus the importance of requiring higher aptitude area scores for lower mental category enlisted men than for men of average or higher general ability is reinforced by these data.

The usefulness of background and personality-type measures for supplementary screening of Category IV men was also investigated. Using the 1958 follow-up samples, results indicated some promise^{3/}. The principal findings, however, were that scales of items derived on combat samples were also valid in technical samples, and that scales derived from a military adjustment criterion (incidence of disciplinary action vs no incidence) were also predictive of the job performance rating criterion. In other words, it appears that in the case of lower mental category EM, the social-personal factors related to job performance are general across jobs and relate to a broad adjustment to military life rather than to the specific jobs alone. This contrasts with the findings that specific interests relate to performance in limited MOS areas and that career motivation may be either general or specific to limited areas.

PHYSICAL PROFICIENCY MEASURES FOR USE IN CLASSIFICATION

The exploratory phase of research to develop physical proficiency measures to predict performance in combat and combat support jobs having high physical requirements was concentrated in two areas: (1) identifying Army enlisted jobs with high physical demands and investigating the nature of those demands, and (2) identifying promising techniques for measuring physical capabilities related to the demands of Army jobs.

The range of jobs to be studied was delimited first by use of job analysis data gathered for the purpose of revising the PULHES system of medical classification. A series of field visits followed, including visits to the U. S. Military Academy, Basic Combat Training Centers, and the Advanced Individual Trainings centers for Infantry, Ranger, Armor, Field Artillery, Air Defense, Combat Engineer, Signal, and Military Police. Benchmark MOS for which men are trained at each installation were selected for initial study (Appendix Table A-5).

^{2/} Adequate probability is defined as 75% chance of passing.

^{3/} Unbiased validity coefficients in the .20 - .30 range were obtained within the Category IV samples alone.

Table 3

PERCENT OF EM IN LOWER MENTAL CATEGORIES
EXPECTED TO PASS ARMY SCHOOL MOS TRAINING COURSES

| Area | Level | MOS Groups | Percent Expected to Pass | |
|---------------------|---------|---------------|--------------------------|------------|
| | | | AFQT 10-30 | AFQT 31-50 |
| Electronics | High | 28,29 | 26 | 44 |
| | Average | 22,25,27,31 | 54 | 68 |
| | Low | 32,34,35 | 85 | 93 |
| General Maintenance | High | 42,45 | 34 | 54 |
| | Average | 41,44 | 64 | 79 |
| | Low | 54,55 | 90 | 95 |
| Motor Maintenance | High | 634,635 | 24 | 43 |
| | Average | 621,631,632 | 54 | 72 |
| Clerical | High | 716,2,719,743 | 30 | 48 |
| | Average | 71,76 | 53 | 71 |
| General Technical | High | 91,93 | 39 | 52 |
| | Average | 95 | 61 | 78 |
| | Low | 910,941 | 86 | 94 |

Plans were drawn up to assemble and try out a set of tests for use as measures of physical proficiency and as predictors of levels that could be attained through appropriate physical training. Rather than traditional measures which for the most part are based on body manipulation, the projected experimental battery emphasizes muscle-group measures of peak output, muscular and cardiopulmonary endurance, and persistence, and includes anthropometric measures of speed, flexibility, balance, and coordination. Results of this exploratory phase will provide the basis for continued effort when additional research facilities become available.

RESEARCH PLANS FOR 1964

Final results on the several series of studies--experimental ADAS aptitude measures, new information and interest tests, and personality scales--are expected in the current year. These results will include an integrated analysis of the potential contribution to classification which the new measures would make as parts of the ACB. On the basis of such indications, an experimental battery will be validated across benchmark MOS representing all occupational areas. Administration of this battery to MOS training input samples is anticipated in the latter part of 1964.

An instrument to identify the most likely career soldiers in reception processing will be tried out by a similar procedure. Interim evaluation of effectiveness in predicting intention during the latter part of the first year of service will be made in 1965. In the meantime, special studies of changes in intention with regard to reenlistment will be made in samples tested at important career points, such as completion of Basic Combat Training and Advanced Individual Training, overseas assignment, and MOS reclassification. Results of the first such study will be analyzed in 1964.

Two special short-term research efforts are to be carried out in 1964. First is a consultative service to improve enlisted classification in the Republic of Korea Army. A senior psychologist of the NCT Task is on duty in Korea for a period of 3 to 6 months to assist classification personnel of the Republic of Korea Army (ROKA). Assistance will be of three kinds: (1) review of the current system and advice on changes to be made based on observation and information already available; (2) identification of problems peculiar to the Korean culture existing in the measurement of potential for MOS performance in Korean manpower input; and (3) setting up of research designs for extensive validation studies of classification measures and techniques. These designs will be executed by ROKA personnel, appropriate contact being maintained with task personnel in APRO after conclusion of the visit.

A second special project to be undertaken in 1964 is the construction and standardization of revised shorter ACB tests. Just as the Army Qualification Battery tests provided effective measurement over a limited lower range--appropriately 70 to 110 in Army Standard Score--so the new shorter tests will provide measurement over the higher range--standard scores 100 to 150. The objective would be to maximize efficiency of screening and classification testing by having all men who qualify by passing the 10th percentile requirement on AFQT take the AQB at Armed Forces Examining Stations. All men accepted would then take the higher range tests at Reception Stations. Thus both testing facilities and data obtained would be put to maximum use. Time saved in reception testing could then be devoted to applying improved classification techniques available when the ACB and Aptitude Area System have been reconstituted.

To the extent time and personnel are available, exploratory studies will be undertaken in support of the major objectives of the New Classification Techniques Task. Such studies will be directed to analysis of the process of responding to test questions and tasks, and of the effects of different modes of presentation: verbal vs graphic, visual vs auditory, etc. A study of the applicability of statistical methods such as correction for multivariate selection to empirical Army data is under way. Analysis of the differences in the level and interrelationships of abilities for samples of enlisted input, using general mental ability or background variables such as educational and socio-economic level as moderators are also planned. Results of such studies would be expected to be useful in illuminating problems of optimum measurement and use of manpower talent resources in the Army personnel system.

APPENDIX

Tables are included which constitute the basis of findings reported in Technical Research Report 1137 or which summarize results of a research study.

Table A-1

INTERCORRELATIONS OF TESTS OF 1963 ARMY CLASSIFICATION BATTERY FULL MOBILIZATION BASE

| ACB Test | Intercorrelations | | | | | | | | | |
|--------------------------------|-------------------|-----------|-----------|-----------|-----------|------------|------------|------------|-----------|----------------|
| | <u>VE</u> | | | | | | | | | |
| Verbal (VE) | | | | | | | | | | |
| Arithmetic Reasoning (AR) | .72 | <u>AR</u> | | | | | | | | |
| Pattern Analysis (PA) | .57 | .66 | <u>PA</u> | | | | | | | |
| Mechanical Aptitude (MA) | .57 | .59 | .59 | <u>MA</u> | | | | | | |
| Classification Inventory (CI) | .51 | .49 | .43 | .46 | <u>CI</u> | | | | | |
| Army Clerical Speed (ACS) | .48 | .58 | .48 | .42 | .33 | <u>ACS</u> | | | | |
| Army Radio Code (ARC) | .54 | .57 | .49 | .49 | .41 | .49 | <u>ARC</u> | | | |
| General Information Test (GIT) | .67 | .63 | .59 | .59 | .55 | .42 | .49 | <u>GIT</u> | | |
| Shop Mechanics (SM) | .61 | .61 | .58 | .72 | .51 | .39 | .40 | .67 | <u>SM</u> | |
| Automotive Information (AI) | .39 | .42 | .41 | .63 | .44 | .25 | .30 | .56 | .67 | <u>AI</u> |
| Electronics Information (ELI) | .58 | .56 | .57 | .63 | .48 | .29 | .35 | .63 | .66 | .60 <u>ELI</u> |

Table A-2

INTERCORRELATIONS OF 1963 ACB APTITUDE AREAS FULL MOBILIZATION BASE

| Aptitude Area | ACB Com- ponents | Intercorrelations | | | | | | |
|-------------------------------|---------------------|-------------------|-----------|-----------|-----------|-----------|-----------|---------------|
| Infantry (IN) | AR+ <u>2</u> CI | <u>IN</u> | | | | | | |
| Armor-Artillery-Engineer (AE) | GIT+AI | .65 | <u>AE</u> | | | | | |
| Electronics (EL) | MA+ <u>2</u> ELI | .63 | .76 | <u>EL</u> | | | | |
| General Maintenance (GM) | PA+ <u>2</u> SM | .67 | .77 | .78 | <u>GM</u> | | | |
| Motor Maintenance (MM) | MA+ <u>2</u> AI | .57 | .90 | .79 | .74 | <u>MM</u> | | |
| Clerical (CL) | VE+ACS | .66 | .57 | .58 | .66 | .48 | <u>CL</u> | |
| General Technical (GT) | VE+AR | .76 | .64 | .68 | .73 | .55 | .87 | <u>GT</u> |
| Radio Code (RC) | VE+ARC | .68 | .60 | .61 | .65 | .51 | .83 | .87 <u>RC</u> |

Table A-3

MEDIAN DIFFICULTY AND VALIDITY OF ITEMS IN 12 MECHANICAL KNOWLEDGE SCALES

| Test | Content of Scale | Median Percent Correct Solution | Median Item Valid- ity Coefficient (point-biserial) ^a |
|-------------------------|-------------------|------------------------------------|--|
| Tool Knowledge, TK-1X | Construction (I) | 69 | .22 |
| | Construction (II) | 70 | .18 |
| | Electrical (I) | 62 | .18 |
| | Electrical (II) | 74 | .24 |
| | General (I) | 66 | .16 |
| | General (II) | 80 | .16 |
| Trade Knowledge, TRK-1X | Construction | 52 | .18 |
| | Electrical | 67 | .17 |
| | General | 52 | .14 |
| Trade Knowledge, TRK-1Y | Construction | 56 | .16 |
| | Electrical | 68 | .20 |
| | General | 67 | .16 |

^aCoefficients are weighted averages of all samples included.

Table A-4

VALIDITY OF NONCOGNITIVE QUESTIONNAIRE SCALES FOR PERFORMANCE IN MOS TRAINING

| Validity Coefficients ^a | | | | | | | | | | | | |
|------------------------------------|--------------------|------------------------|------------|------------|-------------------|------------|--------------------|------------|------------|-----------------------|------------|--|
| ADAS Part | Scale | Electronics Repair MOS | | | Mech Maint MOS | | Motor Maint MOS | | | Clerical MOS 710-1 | | |
| | | 231-4 | 250 | 271-81 | 294-6 | 321 | 440 | 626 | 630 | | 670 | |
| 2 | Electronics | <u>.32</u> | <u>.32</u> | <u>.50</u> | <u>.40</u> | .20 | .18 | .13 | .33 | .29 | .00 | |
| 2 | Mechanical | .11 | -.15 | .04 | .11 | <u>.37</u> | <u>.17</u> | <u>.23</u> | <u>.33</u> | <u>.12</u> | -.25 | |
| 2 | Clerical | .00 | .14 | .20 | .15 | -.10 | .18 | .12 | .05 | .09 | <u>.47</u> | |
| 7 | Mechanical | -.01 | -.02 | .25 | .22 | <u>.22</u> | <u>.08</u> | <u>.19</u> | <u>.40</u> | <u>.13</u> | -.14 | |
| 7 | Clerical | -.06 | .22 | .12 | .35 | .21 | .40 | .22 | .44 | .24 | <u>.42</u> | |
| 7 | General Adjustment | -.05 | .13 | .11 | .33 | .22 | .24 | .06 | .51 | .20 | .52 | |

^aCoefficients expected to be highest are underlined.

Table A-5

CORRELATIONS OF NONCOGNITIVE QUESTIONNAIRE SCALES
WITH ACB SPECIFIC APTITUDE TESTS

| ADAS Part | Scale | Correlation Coefficients ^a with ACB Tests | | | |
|--------------|--------------------|--|-------------------|---------------------------|------------------------|
| | | Electronics Information | Shop Mechanics | Automotive Information | Army Clerical Speed |
| 2 | Electronics | <u>.41</u> | .33 | .26 | .21 |
| 2 | Mechanical | .16 | <u>.23</u> | <u>.48</u> | -.13 |
| 2 | Clerical | .08 | .09 | -.04 | <u>.36</u> |
| 7 | Mechanical | .20 | <u>.22</u> | <u>.33</u> | -.07 |
| 7 | Clerical | .23 | .24 | .19 | <u>.24</u> |
| 7 | General Adjustment | .21 | .22 | .16 | .24 |

^a Coefficients expected to be highest are underlined.

Table A-6

SUMMARY OF PHYSICAL DEMANDS IDENTIFIED IN SELECTED
COMBAT AND COMBAT SUPPORT MOS

| MOS | Most Demanding Activities | Nature of Unusual Demand ^a | | | | |
|--|---|---------------------------------------|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| Infantryman MOS 111, 112 | Patrol member | B ^b | | B | | |
| | Digging in, constructing fortifications | B | B | | B | |
| | Carrying and loading arms and ammunition | | B | | B | |
| | Combat (including hand-to-hand) | A | | A | A | A |
| Field Artillery MOS 141, 142 | Lifting, stacking, carrying ammunition | | A | | A | |
| | Loading operations of gun | | A | | A | B |
| | "Manhandling" gun and gun trails | | A | | | |
| | Digging in gun and fortifications | | B | B | | B |
| Airborne Infantryman MOS 111.17 | Absorbing shock upon landing | B | | | | B |
| | Lifting, carrying equipment in field | | B | | A | A |
| | Marching, running with heavy equipment | A | B | A | A | A |
| | Climbing and rappelling | A | B | A | B | A |
| | Combat (including hand-to-hand) | A | | A | A | A |
| Armor Crewman MOS 131 | Stacking ammunition in racks | | B | | B | B |
| | Loading operations of gun | | B | | B | A |
| Tank Recovery Specialist MOS 633 | Lifting, carrying heavy blocks, tackles, and cables | | A | | A | |
| | Handling segments of tank tracks and repairing tracks | | A | | A | B |
| Combat Engineer MOS 120 | Lifting and carrying mines | | B | | | |
| | Lifting, handling construction supplies | | A | | A | B |
| | Digging and shoveling | | A | B | A | |
| Infantryman- Ranger MOS 111.7 | Climbing and rappelling | A | B | A | B | A |
| | Sustained marching over rough terrain | A | B | A | A | B |
| | Combat (including hand-to-hand) | A | | A | A | A |
| | Swimming with equipment | A | B | A | A | A |
| | Running, jumping | A | B | A | A | A |

^aNumbers designate the following respective factors:

- 1-Unusual Body-Manipulation demands (strength)
- 2-Unusual Object-Manipulation demands (strength)
- 3-Unusual cardio-pulmonary endurance
- 4-Unusual muscular endurance
- 5-Flexibility, speed, coordination, and balance

^bA designates high ability requirements; B, above average requirements.

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U. S. Army Personnel Research Office, OCED, DA
RESEARCH TO IMPROVE ENLISTED CLASSIFICATION TECHNIQUES by
William H. Helme. June 1964. Rept. on New Classification
Techniques Task.--24 p. incl. tables. (USAPRO Technical
Research Report No. 1137)
(DA Project 2J024701A722) Unclassified Report

Research responsive to the Army requirement for maintenance and continued development of the aptitude area system of differential classification of enlisted men is reviewed. Research effort of the NEW CLASSIFICATION TECHNIQUES Task has been devoted substantially to improved measures for the Army Classification Battery (ACB) and identification of combinations of tests which are the most effective differential predictors of success in occupational areas and subareas. Additional Task objectives encompass (1) identifying potential career enlisted men; (2) screening and assignment of enlisted men of relatively low ability, (3) developing physical proficiency measures to classify EM for combat and combat-support MOS with unusual physical demands. New Classification tests developed and ready for comprehensive evaluation as potential components of the ACB include: aptitude and ability tests for Electronics, General Maintenance, Motor Maintenance, and Clerical job areas; three information tests for Construction and Mechanical-Electrical jobs; and personality-interest measures.

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